WHAT IS CLAIMED IS:

sub B3

1. A nucleic acid fragment selected from any of a base sequence shown in SEQ ID NOs: 1 to 9, or complementary base sequence thereof, or modified sequence subjected to a mutation based on these base sequences.

2. A nucleic acid fragment that can be utilized as a primer or probe comprising the nucleic acid fragment according to claim 1, or a nucleic acid fragment comprising a partial sequence in a base sequence thereof.

3. The nucleic acid fragment according to claim 1, wherein a mutation based on a base sequence shown in SEQ ID NOs: 1 to 9 or a complementary base sequence thereof is partial deletion of the base sequence, addition of an extra base or base sequence, or substitution of bases or partial sequence in the base sequence with other base or base sequence, or combination thereof.

4. The nucleic acid fragment according to claim 2, wherein a mutation based on a base sequence shown in SEQ ID NOs: 1 to 9 or a complementary base sequence thereof is partial deletion of the base sequence, addition of an extra base or base sequence, or

substitution of bases or partial sequence in the base sequence with other base or base sequence, or combination thereof.

5. A primer comprising a nucleic acid fragment that can be utilized as a primer according to any one of claim 2, 3 or 4, in which, as an additional modification, a marker bound onto a molecule of said nucleic acid fragment, and/or a moiety capable of binding to a solid-phase carrier may be introduced.

6. A probe comprising a nucleic acid fragment that can be utilized as a probe according to any one of claim 2, 3 or 4, in which, as an additional modification, a marker bound onto a molecule of said nucleic acid fragment, and/or a moiety capable of binding to a solid-phase carrier may be introduced.

7. A primer comprising a combination of two kinds of nucleic acid fragments with a substantial difference in base sequence, wherein at least one of said two kinds of nucleic acid fragments is a nucleic acid fragment for a primer according to claim 5, and

a marker, and/or a moiety capable of binding to a solid-phase carrier may be introduced into each molecule of said two nucleic acid fragments.

8. The primer according to any of claim 5, wherein the base sequence of a nucleic acid fragment for primer according to claim 5 is a modified base sequence subjected to a mutation, such as partial deletion of the base sequence, addition of an extra base or base sequence, or substitution of a base or partial sequence in the base sequence with other base or base sequence, or combination thereof, based on a base sequence shown in SEQ ID NO: 1 to 9 or complementary base sequence thereof.

9. The primer according to claim 7, wherein the base sequence of a nucleic acid fragment for primer according to claim 5 is a modified base sequence subjected to a mutation, such as partial deletion of the base sequence, addition of an extra base or base sequence, or substitution of a base or partial sequence in the base sequence with other base or base sequence, or combination thereof, based on a base sequence shown in SEQ ID NO: 1 to 9 or complementary base sequence thereof.

10. The primer or probe according to claim 5, wherein said primer or probe comprises at least one kind of nucleic acid fragment subjected to an additional modification, and the additional modification in one kind of said nucleic acid fragment

is introduction of a marker or moiety capable of binding to a solid-phase carrier into a 5'-terminal side of the nucleic acid fragment.

11. The primer or probe according to claim 6, wherein said primer or probe comprises at least one kind of nucleic acid fragment subjected to an additional modification, and the additional modification in one kind of said nucleic acid fragment is introduction of a marker or moiety capable of binding to a solid-phase carrier into a 5'-terminal side of the nucleic acid fragment.

12. The primer or probe according to claim 7, wherein said primer or probe comprises at least one kind of nucleic acid fragment subjected to an additional modification, and the additional modification in one kind of said nucleic acid fragment is introduction of a marker or moiety capable of binding to a solid-phase carrier into a 5'-terminal side of the nucleic acid fragment.

13. The primer or probe according to claim 8, wherein said primer or probe comprises at least one kind of nucleic acid fragment subjected to an additional modification, and the additional modification in one kind of said nucleic acid fragment

is introduction of a marker or moiety capable of binding to a solid-phase carrier into a 5'-terminal side of the nucleic acid fragment.

14. The primer or probe according to claim 5, wherein a marker or a moiety capable of binding to a solid-phase carrier to be introduced into a molecule as an additional modification is any of biotin residue, 2,4-dinitrophenyl group, and digoxigenin residue.

15. The primer or probe according to claim 6, wherein a marker or a moiety capable of binding to a solid-phase carrier to be introduced into a molecule as an additional modification is any of biotin residue, 2,4-dinitrophenyl group, and digoxigenin residue.

16. The primer or probe according to any of claim 7 or 8, wherein a marker or a moiety capable of binding to a solid-phase carrier to be introduced into a molecule as an additional modification is any of biotin residue, 2,4-dinitrophenyl group, and digoxigenin residue.

17. The primer or probe according to claim 9, wherein a marker or a moiety capable of binding to a solid-phase carrier to be introduced into a molecule as an additional modification is any of biotin residue,

2,4-dinitrophenyl group, and digoxigenin residue.

SUB A1

18. The primer or probe according to any one of claims 10 to 13, wherein a marker or a moiety capable of binding to a solid-phase carrier to be introduced into a molecule as an additional modification is any of biotin residue, 2,4-dinitrophenyl group, and digoxigenin residue.

19. A method of detecting a PHA synthesizing microorganism, wherein said method uses at least one kind of nucleic acid fragment according to any one of claim 1 to 4 as a probe.

20. A method of detecting a polyhydroxyalkanoate synthesizing microorganism, wherein said method uses at least one kind of nucleic acid fragment according to any one of claim 1 to 4 as a primer.

21. A method of detecting a polyhydroxyalkanoate synthesizing microorganism, wherein said method uses a primer according to claim 5, and comprises the following four steps of:

(1) preparing a sample in which the presence or absence of a PHA synthesizing microorganism is to be detected;

(2) performing a lysis treatment of cells in the

sample, if necessary;

(3) adding said primer to the sample and performing an elongation reaction of the primer; and

(4) performing a detecting operation of the elongation reaction products obtained from the step (3), or

said steps (1), (3), and (4), as well as step (2), if necessary, are conducted.

22. A method of detecting a polyhydroxyalkanoate synthesizing microorganism, wherein said method uses a primer according to claim 7, and comprises the following four steps of:

(1) preparing a sample in which the presence or absence of a PHA synthesizing microorganism is to be detected;

(2) performing a lysis treatment of cells in the sample, if necessary;

(3) adding said primer to the sample and performing an elongation reaction of the primer; and

(4) performing a detecting operation of the elongation reaction products obtained from the step (3), or

said steps (1), (3), and (4), as well as step (2), if necessary, are conducted.

Sub B2

23. The method of detecting a polyhydroxyalkanoate synthesizing microorganism

according to any of claim 21 or 22, wherein said method uses the primer comprising a combination of two kinds of nucleic acid fragments according to claim 7.

Sub A2

24. The method of detecting a polyhydroxyalkanoate synthesizing microorganism according to any of claim 21 or 22, wherein said elongation reaction of a primer in step (3) is performed by a polymerase chain reaction.

25. The method of detecting a polyhydroxyalkanoate synthesizing microorganism according to claim 23, wherein said elongation reaction of a primer in step (3) is performed by a polymerase chain reaction.